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UTILITY PATENT APPLICATION TRANSMITTAL

(Only for new nonprovisional applications under 37 C.F.R. § 1.53(b))

Attorney Docket No.

First Inventor or Application Identifier: JOHN L. BRECKENRIDGE

Title: METHOD AND APPARATUS for an Intelligent Telephone Prefix Dialer

Express Mail Label No.: EJ743164399US

APPLICATION ELEMENTS

See MPEP chapter 600 concerning utility patent application contents.

ADDRESS TO: Box Patent Application, Washington, DC 20231

1. [X] * Fee Transmittal Form *(e.g., PTO/SB/17)* *(Submit an original and a duplicate for fee processing)*
2. [X] Specification [Total Pages 18]
   (preferred arrangement set forth below)
   - Descriptive title of the Invention
   - Cross References to Related Applications
   - Statement Regarding Fed sponsored R & D
   - Reference to Microfiche Appendix
   - Background of the Invention
   - Brief Summary of the Invention
   - Brief Description of the Drawings *(if filed)*
   - Detailed Description
   - Claim(s)
   - Abstract of the Disclosure
3. [X] Drawing(s) *(35 U.S.C. 113)* [Total Sheets 14]
4. Oath or Declaration [Total Pages 2]
   a. [X] Newly executed (original or copy)
   b. [ ] Copy from a prior application (37 C.F.R. § 1.63(d)) *(for continuation/divisional with Box 16 completed)*
      i. [ ] DELETION OF INVENTOR(S) Signed statement attached deleting inventor(s) named in the prior application, see 37 C.F.R. §§ 1.63(d)(2) and 1.33(b).

NOTE FOR ITEMS 1 & 13: IN ORDER TO BE ENTITLED TO PAY SMALL ENTITY FEES, A SMALL ENTITY STATEMENT IS REQUIRED (37 C.F.R. § 1.27), EXCEPT IF ONE FILED IN A PRIOR APPLICATION IS RELIED UPON (37 C.F.R. § 1.28).

5. [ ] Microfiche Computer Program *(Appendix)*
6. Nucleotide and/or Amino Acid Sequence Submission *(if applicable, all necessary)*
   a. [ ] Computer Readable Copy
   b. [ ] Paper Copy (identical to computer copy)
   c. [ ] Statement verifying identity of above copies

ACCOMPANYING APPLICATION PARTS

7. [ ] Assignment Papers (cover sheet & document(s))
8. [ ] 37 C.F.R.§3.73(b) Statement *(when there is an assignee)* [ ] Power of Attorney
9. [ ] English Translation Document *(if applicable)*
10. [ ] Information Disclosure Statement (IDS)/PTO-1449 [ ] Copies of IDS Citations
11. [ ] Preliminary Amendment
12. [X] Return Receipt Postcard (MPEP 503) *(Should be specifically itemized)*
13. [X] * Small Entity Statement(s) *(PTO/SB/09-12)* [ ] Statement filed in prior application, Status still proper and desired
14. [ ] Certified Copy of Priority Document(s) *(if foreign priority is claimed)*
15. [X] Other: REQUEST UNDER MPEP § 707.07(j)

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    [ ] Continuation [ ] Divisional [ ] Continuation-in-part (CIP) of prior application No: ____/____
    Prior application information: Examiner _____ Group / Art Unit: _____
    For CONTINUATION or DIVISIONAL APPS only: The entire disclosure of the prior application, from which an oath or declaration is supplied under Box 4b, is considered a part of the disclosure of the accompanying continuation or divisional application and is hereby incorporated by reference. The incorporation can only be relied upon when a portion has been inadvertently omitted from the submitted application parts.

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Signature	John L Breckenridge	Date	3-15-00

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Very respectfully,

John L. Breckenridge 3-15-00

John L. Breckenridge, Inventor Applicant

PTO/SB/09 (12-97)
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STATEMENT CLAIMING SMALL ENTITY STATUS (37 CFR 1.9(f) & 1.27(b))--INDEPENDENT INVENTOR	Docket Number (Optional)

Applicant, Patentee, or Identifier: JOHN L. BRECKENRIDGE

Application or Patent No.: _____

Filed or Issued: _____

Title: METHOD AND APPARATUS FOR AN INTELLIGENT TELEPHONE PREFIX DIALER

As a below named inventor, I hereby state that I qualify as an independent inventor as defined in 37 CFR 1.9(c) for purposes of paying reduced fees to the Patent and Trademark Office described in:

- [X] the specification filed herewith with title as listed above.
- [ ] the application identified above.
- [ ] the patent identified above.

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Separate statements are required from each named person, concern, or organization having rights to the invention stating their status as small entities. (37 CFR 1.27)

I acknowledge the duty to file, in this application or patent, notification of any change in status resulting in loss of entitlement to small entity status prior to paying, or at the time of paying, the earliest of the issue fee or any maintenance fee due after the date on which status as a small entity is no longer appropriate. (37 CFR 1.28(b))

JOHN L. BRECKENRIDGE		
NAME OF INVENTOR	NAME OF INVENTOR	NAME OF INVENTOR
John L. Breckenridge		
Signature of inventor	Signature of inventor	Signature of inventor
3-15-00		
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United States Patent

Application

Method and Apparatus for an Intelligent Telephone Prefix Dialer

Prepared by: John L. Breckenridge

Inventor: John L. Breckenridge

03/15/2000

Table of Contents

1. SPECIFICATION

Method and Apparatus for an Intelligent Telephone Prefix Dialer

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1.1. RELATED U.S. PATENT DOCUMENTS

5,859,896	
5157719	
5309508	

1.2. BACKGROUND-FIELD OF THE INVENTION

The invention relates to a method and apparatus for dialing a predetermined telephone number prefix, such as an area code, along with the suffix, comprising the complete telephone number for successfully completing calls where such a requirement exists in the Central Office used by the calling party, and for selectively activating said method and apparatus.

1.3. BACKGROUND-DESCRIPTION OF RELATED ART

Local telephone calls have, for many years, been effected by dialing a seven digit code. Most recently, however, the demand for telephone number assignments has increased dramatically due to subscribers' use of telephone lines for fax machines, and the internet as well as separate voice lines. New housing developments have also increased the demand for telephone number assignments.

One technological advance which promises to alleviate this problem for a number of years is to require a calling party to dial the area code of a called party even when the two parties are within a common area code. Thus, one would be

required to dial a ten digit code even if the called party is next door. It will be readily apparent that this change is highly inconvenient to many persons who wish to continue the use of the traditional seven digit dialing for local calls. Accordingly it will be understood that a method and apparatus which, in such a contemplated modified telephone dialing system, permits the ongoing use of standard seven digit dialing for routine local calls would be highly desirable, and it is to this end that the present invention is directed.

1.4. OBJECTS AND ADVANTAGES

"Here's some scary math: Mark Cooper, research director of the Consumer Federation of America, estimates 10-digit dialing adds two seconds of dial time of each call made, increases error rates by 43 percent, and could cost telephone customers up to $22 million annually in lost time."

" Fortunately, experience doesn't support such dire predictions; error rates dropped dramatically after only one day of 10-digit dialing in Maryland. And at U S WEST, we're committed to helping customers make the transition with the greatest possible ease. Here, each switch to 10-digit local dialing takes our employees nearly a year of planning and preparation." ... US West Observations.

The object of my invention is to allow subscribers to continue their 7 digit dialing habits. Notwithstanding the US West Observation that subscribers adjust to 10 digit dialing and reduce error rates, 10 digit dialing is still a hassle. Error rates may have been reduced, but consumers would rather not use the additional time and mental processing to formulate a 10 digit dial sequence, especially if there is a technologically feasible alternative. While there is already a solution for frequently dialed numbers, stored automatic dialing either from the subscriber's handset or the Central Office switch, (Speed dialing options), there currently is no safe, fool-proof solution that contemplates implementation either in the subscriber's equipment or the Central Office equipment for less frequently dialed numbers, such as a number the subscriber dials from a telephone directory.

Most subscribers have a pattern of dialing that presupposes using a specific Numbering Plan Area number, (NPA) more frequently than any other overlayed NPA number. With my invention a subscriber designated NPA number can be stored for use with any seven digit number the subscriber dials. Moreover, if desired by the subscriber, an NPA-Nxx number may be stored in my invention, thus fascilitating xxxx, 4 digit dialing by the subscriber for call completion.

It is therefore an object of the invention to provide a method and apparatus that is responsive to the 7 or less digit number dialed by the calling party, and eliminate the necessity for the calling party to dial any predetermined code, such as an area code, prior to entering the called party's local telephone number.

A further object of the invention is to provide a method and apparatus which includes the feature of having the predetermined code being programmable by the subscriber.

It is a more specific object of the invention to provide a method and apparatus of dialing the predetermined code plus the receiving party's telephone number after the calling party dials a seven or less than seven digit sequence of the receiving party. In another aspect, it is an object of the invention to provide such method and apparatus which includes a feature to automatically remain quiescent when appropriate such as when a long distance call is dialed or when 911, 411 or any other special dial string that does not require dialing assistance from the Intelligent Telephone Prefix Dialer.

1.5. BRIEF SUMMARY OF THE INVENTION

Briefly the objects as described in ***OBJECTS OF THE INVENTION***, section 1.4. and other objects, are achieved by a method and apparatus in which a re-dialer is selectively activated and transmits a local area code or other required code along with the subscriber[1] entered dial string on the caller's telephone line when the intelligent prefix dialer algorithmically determines that its activity is required to successfully complete the address of the called party. Thus the calling subscriber may dial 7 digits to complete the call, and when the subscriber has entered more than three digits into the intelligent prefix dialer as the pre-stored prefix code, the subscriber may dial less than 7 digits to complete the call.

1.6. DESCRIPTION OF THE DRAWINGS, FIGS. 1 THROUGH 6

Figure 1 illustrates the connection between the calling subscriber's telephone or other equipment to the intelligent prefix dialer, the connection of the Intelligent prefix dialer to the telephone line at the subscriber's location, and the continuation of the telephone line to the central office, ultimately connecting to the called party's telephone or other equipment.

Figure 2a is a schematic block diagram detailing the line interruption connection, the dtmf transceiver connection, and the line state detector connection to the subscriber's incoming telephone line. The schematic of Figure 2a also shows the line interruption control circuit in block diagram format.

Figure 2b is a schematic block diagram of an exemplary embodiment of the inventive apparatus.

Figure 3 is a schematic block diagram of an alternative embodiment of the inventive apparatus, integrated into a typical POTS, analog telephone set.

Figure 4 is a schematic bloc diagram of an alternative embodiment of the inventive apparatus, integrated into a typical ISDN telephone set.

---

[1] The term "subscriber" and the term "calling party" are used interchangeably in this document

Figure 5 is a schematic block diagram representing a further embodiment of the inventive method within the Service Provider's Advanced Intelligent Network, (AIN), equipment.

Figure 6 is a pseudo code representation of the programmed instructions required to effect the functionality as described in the Detailed Description of the Invention.

1.7. DETAILED DESCRIPTION OF THE INVENTION, PREFERRED EMBODIMENT(S)

Referring to FIG. 1 for a description of a representative environment, note that the standalone embodiment of the intelligent telephone prefix dialer presupposes a standard telephone interface between the telephone line, the intelligent telephone prefix dialer, and the subscriber's telephone or other subscriber equipment.

Referring to FIGs. 2a and 2b. A block diagram of the apparatus appears with Fig 2a detailing the nature of the line interrruption circuitry. From both diagrams, Fig 2a and Fig. 2b it will be understood by those skilled in the art that with respect to all components of the inventive apparatus, various physical implementations are possible to achieve the results contemplated by this particular embodiment of the inventive apparatus.

In Fig 2b the line interruption circuit 7 is provided to create a hook switch flash upon a software request from the processor 1. The requisite control signal from the processor is transmitted through the isolation circuit 6. The isolation circuit is provided to isolate currents and voltages typically found in the type of relay that would be used in the line interruption circuit from the processor hardware, so that a much smaller voltage and or current may be used to effect relay activation at the line interruption circuit. Isolation circuit methods may vary and are known and understood by those skilled in the art.

As shown in Fig 2a, the output of the dtmf transmitter 3, and the input of the dtmf receiver 3, are both connected to the tip and ring of the subscriber's telephone line in such a manner, (high impedance connection), as to not interfere with the telephone line, either looking towards the Central Office, or back to the subscriber's other Customer Premise Equipment, hereinafter, CPE. The processor 1 controls the dtmf transmitter to send dtmf

data onto the subscriber's telephone line. The processor 1 controls the dtmf receiver to listen for dtmf data on the subscriber's telephone line.

In a similar fashion, the line state detector 2 input is connected to the tip and ring of the subscriber's telephone line, (high impedance connection). The line state detector 2 output is connected to the processor 1.

EEPROM 4 is connected to the processor for communication of non-volatile data such as the predefined dial prefix, to the processor, and the retention of programmed instructions regardless of power cycles or other dynamic environmental conditions which may be encountered by the inventive apparatus.

RAM 5 is connected to the processor for a scratchpad function to hold transient variable data such as the telephone number dialed by the subscriber.

Referring to Fig. 6, the pseudo-code provides the methods required by the inventive apparatus to activate the components outlined in Figs. 2a and 2b. Beginning with processor initialization, the required variable lengths and values are set upon power up of the intelligent telephone prefix dialer.

Referring to Fig. 6 for programmed instruction references and Fig. 2b for hardware component references, when the USER_REQUEST_FLAG is set, processing control transfers to the PARSEOPTIONS subroutine. All items and prompts displayed at the request of PARSEOPTIONS are done through subroutine DISPLAYPREFIX. The PARSEOPTIONS subroutine prompts the user if privacy is desired. If the user responds "Y" for yes then a flag is written to EEPROM which will be used to transmit a *67 as part of the user defined prefix dial string. If the user responds "N" for no then a flag is written to EEPROM which will be used to transmit a *82 as part of the user defined prefix dial string. After the user has responded, or if the user has not responded within a specified time period, The PARSEOPTIONS subroutine will display whether privacy is confirmed on or off.

Similarly PARSEOPTIONS will prompt whether the user desires "1+" dialing or not. If the user selects "1+" dialing, a dtmf 1 will be interspersed betweent the *67/*82 sequence and the rest of the predetermined prefix dial string.

Next PARSEOPTIONS prompts the user to enter a default dialing prefix and responds by writing this prefix into EEPROM. The default dialing prefix is then displayed to the user after the user has entered the dialing prefix or if he/she/ has not entered a dialing prefix within a specified time period, whatever default dialing prefix which was previously stored is displayed. PARSEOPTIONS then returns processing control to the MAIN processing routine.

Referring to Fig. 6 for programmed instruction references and Fig. 2b for hardware component references, subroutines LINEMONITOR, and MONITORLINE use the output of the line state detector, Fig. 2b 2, to trigger from on-hook line condition and off-hook line conditions, respectively. MONITORLINE also counts the amount of time that the line condition is on-hook, if the amount of time is above a threshold value then the on-hook time is flagged, BYPASS set to 1, to not be a flash hook, otherwise the line condition is a flash. LINEMONITOR is used to inhibit operations of the inventive apparatus until the line condition goes on-hook. This feature provides the functionality of permitting the subscriber to send dtmf digits over the network without interference from the inventive apparatus such as when the subscriber is interfacing with a remote automated attendant.

Referring to Fig. 6 for programmed instruction references and Fig. 2b for hardware component references, subroutine GETNDX reads the prefix data in EEPROM to determine the number of digits in the default prefix dial string. Sets an index appropriately then returns. As is shown in Fig. 6 the MAIN routine places the prefix code into the least significant part of the string to be dialed, then starts listening for subscriber dialed digits via the dtmf receiver by transferring control to subroutine CAPTUREDIGITS.

As shown in Fig.6 the CAPTUREDIGITS routine inhibits further processing during the progress of the call if the number of subscriber digits captured does not equal (10 – NDX) + 1, NDX being 1 greater than the number of default prefix digits stored in EEPROM. The effect of this processing gives the subscriber control over when inventive apparatus will

dial for the subscriber, for example, if the prefix is a three digit area code, the inventive apparatus will intervene to complete the call only if the subscriber has dialed a 7 digit number. When CAPTUREDIGITS has captured the subscriber digits and timed out, it returns to MAIN. If the required number of digits have been captured, processing continues to PARSESTRING.

Referring to Fig. 6 for programmed instruction references and Fig. 2b for hardware component references, subroutine PARSESTRING forms a resultant digit sequence by parsing together the default dial prefix and the dial string dialed by the subscriber, then returns to MAIN

Referring to Fig. 6 for programmed instruction references and Fig. 2b for hardware component references, After PARSESTRING, the MAIN routine pauses for a predetermined amount of time then proceeds to effect a hook switch flash via a control signal to the line interruption circuit by calling subroutine FLASHLINE. Upon return MAIN pauses for a predetermined period of time then effects two more flash hooks if the subscriber has interrupted call progress to dial another number for three way calling activation, then processing continues;if the subscriber has not interrupted call progress to dial another number for three way calling activation, then two additional hook switch flashes are bypassed and processing continues.

Referring to Fig. 6 for programmed instruction references and Fig. 2b for hardware component references, MAIN transfers control to subroutine DIALNUMBER in order to dial the resultant digit sequence containing the complete telephone number with the required prefix by means of the dtmf transmitter. Subroutine DIALNUMBER first dials the Caller ID Block Code if the PRIVACY_BIT is set or DIALNUMBER dials the Caller ID Send Code if the PRIVACY_BIT is not set. Next, if the ONE_PLUS_BIT is set then DIALNUMBER dials a 1. Next, the default prefix code and the rest of the telephone number as parsed in PARSESTRING is dialed by DIALNUMBER to complete the call. DIALNUMBER then returns

After processing returns from DIALNUMBER, the inventive apparatus remains quiescent until the subscriber is ready to dial another number.

ISDN AND ANALOG TELEPHONE EMBODIMENTS

As shown in Fig. 3 and Fig. 4 the hardware and programmed instruction components detailed in Fig.s 2a, 2b, and 6 may be integrated into an ISDN telephone set or an Analogue telephone set, and such implementation is within the scope of the principles described in this DETAILED DESCRIPTION OF THE INVENTION.

ADVANCED INTELLIGENT NETWORK (AIN) EMBODIMENT

Referring to Fig. 5 for methodology references, and Fig. 6 for programmed instruction references, the intelligent telephone prefix dialer method may also be implemented in an Advanced Intelligent Network (AIN) environment. Background information related to AIN architecture is incorporated herein by reference; see "***Advanced Intelligent Network*** Release 1 Network and Operations Plan", Special Report, SR-NPL-001623, Issue1, June 1990, Bell Communications Research, also see " ***Advanced IntelligentNetworks – now a reality***" by C.D. Sharp and K. Clegg, Electronics & Communication Engineering Journal, June 1994.

Note that the Service Switching Point (SSP) in Fig. 5 by definition has AIN Switch Capabilities. The Intelligent Peripheral (IP) and the Adjunct are shown for completeness of detail in that my invention may be implemented using the IP and the Adjunct in lieu of exclusive implementation in the SSP and SCP. The Adjunct is functionally equivalent to the SCP but uses a high speed communications channel separate and distinct from the SS7 channel communications between the SCP and the SSP.

The IP may be used to set up sophisticated interaction, e.g. voice interaction, between the subscriber and my invention, in lieu of the stutter dial tone communication shown in Fig. 5. The IP may also be used for the capturing and counting of subscriber dtmf digits in lieu of that functionality being implemented at the SSP.

The user options interface at either the SSP or the IP is responsive to a * code sent from the subscriber indicating that the subscriber wishes to store a default prefix dial string in the user options database in the SCP. Upon dial tone stutter initiated by the IP, the subscriber enters the desired prefix code followed by the # key. These digits are captured by the IP and then forwarded to the user options database via the SS7 channel between the SSP and the SCP.

Confirmation of the default dialing prefix is provided by a voice announcement to the subscriber over the telephone network initiated by the IP.

A variable containing the specified number of digits equaling; (The total number of digits required to complete the call – Number of default dialing prefix digits entered by user) is transmitted from the SSP to the SCP. This variable is recorded in the user options database. The control logic of my invention in the SCP will retrieve the variable containing the specified number of digits to determine whether to activate dialing after the digit capture logic of my invention has timed out.

Once the default dial prefix has been stored in the user options database in the SCP, the intelligent dialing functionality of my invention is prepared for activation. When the subscriber picks up the telephone, the SSP transmits a series of triggers to the SCP indicating call progress, including off-hook line condition, flash-hook line condition, and on-hook line condition. The SCP determines whether the intelligent dialing feature is present in the current subscriber's AIN features list. If yes, the SCP then determines that the intelligent dialing function is to be activated in the dtmf listen mode, and transmits the request to the SSP which is forwarded by the SSP to the IP.

Subsequently, the IP is tasked to capture, count, and timeout dtmf digits sent by the subscriber, while inhibiting those digits from going to the switch, (SSP). When digit capturing by the IP has timed out, such as when the subscriber finishes dialing a number and is no longer entering digits, the IP communicates the subscriber's dialing sequence to the SSP with instructions for the SSP to not complete the call at this time, but to forward the subscriber's dialing sequence to the SCP.

Upon receipt of the subscriber's dialing sequence from the SSP via the SS7 channel, my inventive method in the SCP counts the digits. If the number of digits dialed by the subscriber does not equal said specified number of digits, supra, the SCP transmits instructions back to the SSP to complete the call only with the subscriber's dialing sequence. If the number of digits dialed by the subscriber equals said specified number of digits, supra, the SCP, by means of the control logic of my inventive method, appends the digits dialed by the subscriber to said default dial prefix digits, supra, and temporarily stores the resultant digit sequence. The SCP then transmits the resultant digit sequence back to the SSP, with instructions for the SSP to complete the call using said resultant digit sequence. In accordance with said instructions from the SCP, the call is completed by the SSP. My inventive method then remains quiescent until the subscriber initiates a flash or other hook switch transition.

1.8. SUMMARY, RAMIFICATIONS, AND SCOPE

Briefly, these and other objects of the invention are achieved by an Intelligent Telephone Prefix Dialer which listens for the dial string initiated by the subscriber on the subsriber's telephone line when an off-hook condition is sensed; e.g., when the subscriber picks up the telephone handset, or during call progress when a switch hook flash is detected. Said Intelligent Telephone Prefix Dialer then algorithmically determines whether the subscriber initiated dial string is incomplete If the subscriber initiated dial string was determined to be incomplete, my invention parses the default prefix dial string with the subscriber initiated dial string to form a complete telephone address. The inventive method or apparatus then places the complete telelphone address on to the telephone network for call completion. Thus, the caller can dial an abbreviated number of digits to successfully complete the call.

In order to provide for the selective dialing of long distance, or other dial strings which do not require the Nxx-xxxx dial sequence for call completion, the Intelligent Prefix Dialer automatically inhibits itself from interrupting the subsriber initiated dial sequence thus allowing for successful call completion without intervention from the Intelligent Telephone Prefix Dialer.

1.9. CLAIMS

I claim;

1. Apparatus for dialing an area code and phone number dial string when a calling party dials seven or less digits on a telephone network which requires the area code or the area code and additional digits to be dialed as a prefix to the digits dialed by the calling party for call completion, the apparatus remaining quiescent when a calling party dials less than or more than a predetermined number of digits, or any number of digits during the call after the calling party has connected to the called party, unless the calling party has interrupted the call progress to dial a second called party, the apparatus comprising:

A) A telephone line state detector having an input and an output, said line state detector input being connected to the telephone line of the calling party to detect the load impedance on the telephone line of the calling party and to provide an indicating signal of the line load impedance at said line state detector output.

B) A computer processor connected to said output of said line state detector.

C) A DTMF dialer having an input and an output, said DTMF dialer input being connected to said computer processor and said DTMF dialer output being connected to the telephone line of the calling party.

D) A DTMF receiver having an input and an output, said input of said DTMF receiver connected to the telephone line of the calling party, and said output of said DTMF receiver connected to said computer processor.

E) A line interruption circuit having a control input, a line input, and a line output, said control input of said line interruption circuit being connected to said computer processor through circuit isolation means and said line input of said line interruption circuit being connected to the tip and ring connection of the calling party's telephone, and said line output of said line interruption circuit being connected to the tip and ring connection of the telephone line of the calling party.

F) A non-volatile programmable memory circuit means connected to the computer processor for storing the telephone prefix and other user defined options.

G) A random access memory circuit, RAM, means connected to the computer processor for storing digit strings dialed by the calling party.

H) A user interface device means connected to said computer processor for prompting and acknowledging inputs of user options by the calling party to initialize the apparatus of claim 1.

I) Program instruction means residing in said computer processor or said non-volatile programmable memory circuit for detecting off –hook, on-hook, and hook flash line conditions in response to said indicating signal from said line state detector output.

J) Program instruction means residing in said computer processor or said non-volatile programmable memory circuit for controlling said line interruption circuit effecting a flash hook condition on the telephone line.

K) Program instruction means residing in said computer processor or said non-volatile programmable memory circuit for controlling and responding to said DTMF receiver causing digits dialed by the calling party to be recorded in said RAM connected to said computer processor.

L) Program instruction means residing in said computer processor or said non-voltatile programmable memory circuit through flash hook means sub-claim J wherein one flash is effected of duration between 500 and 700 milliseconds for clearing the telephone line in preparation for dialing the prefix and telephone number specified by the calling party.

M) Program instruction means residing in said computer processor or said non-volatile programmable memory circuit for controlling said DTMF dialer, causing said DTMF dialer to dial the complete dial prefix and telephone number of the dial sequence initiated by the calling party.

N) Program instruction means residing in said computer processor or said non-volatile programmable memory circuit through flash hook means sub-claim J wherein in response to

flash hook detection means, sub-claim I, three successive flashes are effected, each of duration between 500 and 700 milliseconds, within 250 to 325 milliseconds of each other, for retaining line connection to first called party while dialing second called party through means sub-claim M.

O) Program instruction means residing in said computer processor or said non-volatile programmable memory circuit for selectively inhibiting said DTMF dialer, permitting the calling party to successfully complete dial strings other than a specified number of digits directly to the Central Office without intervention by the apparatus of claim 1.

P) Program instruction means residing in said computer processor or said non-volatile programmable memory circuit for selectively inhibiting said DTMF dialer, permitting the calling party to send dial strings of any length to the called party during a call to the called party without intervention by the apparatus of claim 1.

Q) Program instruction means residing in said computer processor or said non-volatile programmable memory circuit for allowing the calling party to pre-store the dial prefix in said apparatus of claim 1.

R) Program instruction means residing in said computer processor or said non-volatile programmable memory circuit for allowing the calling party to verify through user interface means sub-claim H, the dial prefix pre-stored in sub-claim Q.

S) Program instruction means residing in said computer processor or said non-volatile programmable memory circuit for storing "1 +" dialing user option and "privacy" user option, (*67 or *82), as part of the dial prefix to be dialed through means sub-claim M.

I claim;

2. A Method for dialing an area code and phone number dial string when a calling party dials seven or less digits on a telephone network which requires the area code or the area code and additional digits to be dialed as a prefix to the digits dialed by the calling party for call completion, remaining quiescent when a calling party dials less than or more than a predetermined number of digits, or any number of digits during the call after the calling party has connected to the called party, unless the calling party has interrupted the call progress to dial a second called party, the method comprising:

a. Programmed instruction means for providing a user options interface allowing user to define a default dialing prefix.

b. Programmed instruction means for notifying user of the default dialing prefix, sub-claim a

c. Programmed instruction means for calculating a specified number of digits dialed by calling party required to activate the method of claim 2 according to the formula (Specified number of digits = Total number of digits required to complete the call – Number of default dialing prefix digits entered by user, sub-claim a)

d. Programmed instruction means for retrieving the specified number of digits dialed by calling party required to activate the method of claim 2.

e. Programmed instruction means for detecting an off hook , flash hook, or on-hook condition.

f. Programmed instruction means for remaining quiescent until an off hook condition has been sensed.

g. Programmed instruction means for capturing , counting, and temporarily storing dtmf digits dialed by calling party.

h. Programmed instruction means for timing out the programmed instruction means, sub-claim g.

i. Programmed instruction means for appending digits dialed by calling party to the pre-stored prefix digits and temporarily storing the resultant digit sequence if and only if the number of digits dialed by the calling party is equal to the specified number of digits, sub-claim c.

j. Programmed instruction means for placing the resultant digit sequence, sub-claim i on to the Service Provider's network for call completion.

k. Programmed instruction means for placing dtmf digits dialed by calling party, sub-claim g on to the Service Provider's network for call completion if and only if no resultant digit sequence, sub-claim i was stored.

l. Programmed instruction means for remaining quiescent during call progress, sub-claim j, unless a flash hook, or other transition from off-hook, to on-hook, to off-hook, sub-claim e has been detected.

m. Programmed instruction means for re-activating program instruction means sub-claims d through l upon detection of transition from on-hook to off-hook, sub-claim e.

n. The programmed instruction means, sub-claims a through d wherein said programmed instruction means reside and function in the Service Provider's Advanced Intelligent Network Service Control Point, SCP, or other equivalent network element.

o. The programmed instruction means, sub-claims e, f, and g, wherein said programmed instruction means reside and function in the Service Provider's Advanced Intelligent Network Call Control functional area of the Service Switching Point, SSP, or other equivalent network element.

p. The programmed instruction means, sub-claims h and i wherein said programmed instruction means h resides and functions in the Service Provider's Advanced Intelligent Network Intelligent Peripheral, IP, and said programmed instruction means i resides and functions in the Service Provider's Advanced Intelligent Network Service Control Point, SCP.

q. The programmed instruction means, sub-claim j wherein said programmed instruction means reside and function cooperatively between the Service Provider's Advanced Intelligent Network Service Control Point, SCP and said Service Provider's Service Switching Point, SSP, the SCP digitally transmitting said resultant digit sequence, sub-claim j to said SSP upon which said SSP completes the call.

r. The programmed instruction means, sub-claim k wherein said programmed instruction means reside and function cooperatively between the Service Provider's Advanced Intelligent Network Service Control Point, SCP and said Service Provider's Service Switching Point, SSP, the SCP digitally transmitting a null resultant digit sequence, sub-claim k to said SSP upon which said SSP completes the call using only the dtmf digits dialed by the calling party.

s. The programmed instruction means, sub-claims l and m, wherein said programmed instruction means reside and function in the Service Provider's Advanced Intelligent Network Call Control functional area of the Service Switching Point, SSP, or other equivalent network element.

1.10. ABSTRACT

Method and apparatus for an Intelligent Prefix Dialer, eliminating the necessity for manually dialing a local area code as a prefix to a call within the same area code in telephone systems in which such action is a requirement. An Intelligent Prefix Dialer is quiescent and monitors the dialing sequence from the caller's Customer Premise Equipment, CPE, when off-hook condition has been sensed. When the caller wishes to dial seven digits or less of a telephone number, my invention parses a caller defined default prefix, with the abbreviated digits the caller has dialed to form a complete telephone number. The Intelligent Prefix Dialer changes state from quiescent to active and interrupts the call progress to clear the subscriber's telephone line. The Intelligent Prefix Dialer then dials the complete telephone number to successfully complete the call.

The Intelligent Prefix Dialer is also user programable to dial Caller ID Blocking or Caller ID Sending * codes, (i.e., *67 or *82), the Intelligent Prefix Dialer intersperses the area code in the correct position before redialing the number, (i.e., *67NPA-Nxx-xxxx) to successfully complete the call. When required, the Intelligent Prefix Dialer is user programmable to dial 1 plus code access, (i.e. 1NPA-Nxx-xxxx)

Features of the Intelligent Prefix Dialer allow for the seamless, uninterrupted successful completion of dial sequences which a caller may initiate, such as, but not limited to, 411, 911, 0, 1-Nxx-xxxx., and various * codes required by the Central Office for special features subscribed to by the caller.

DRAWING FIGURES

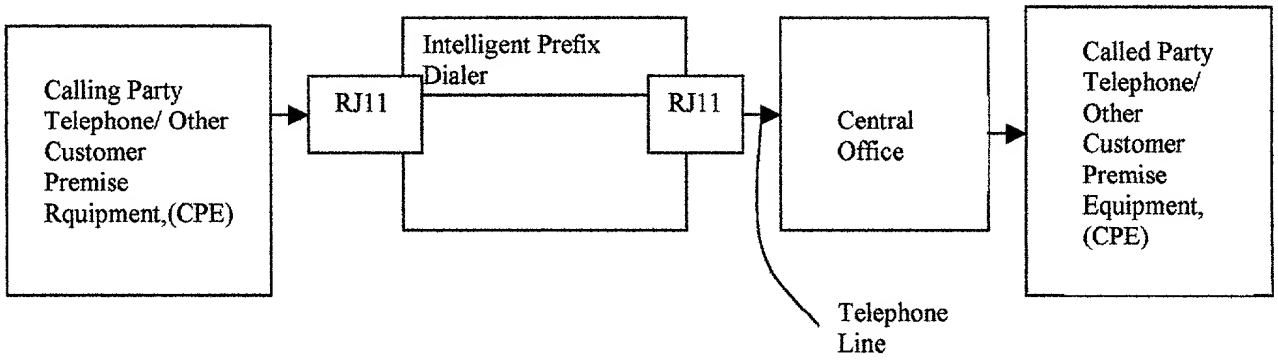


FIGURE 1

Line Interruption Circuit Detailed Configurateion

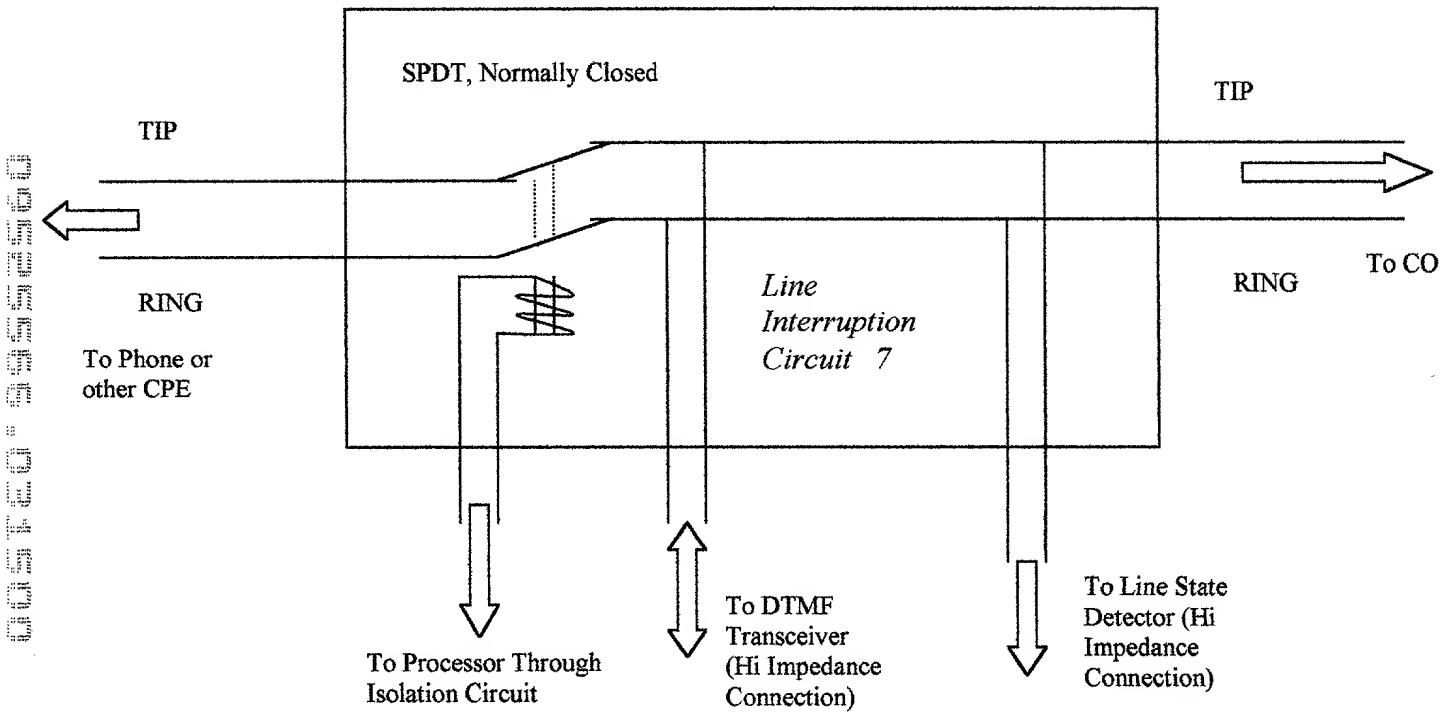


Figure 2a

Intelligent Telephone Prefix Dialer, standalone POTS environment

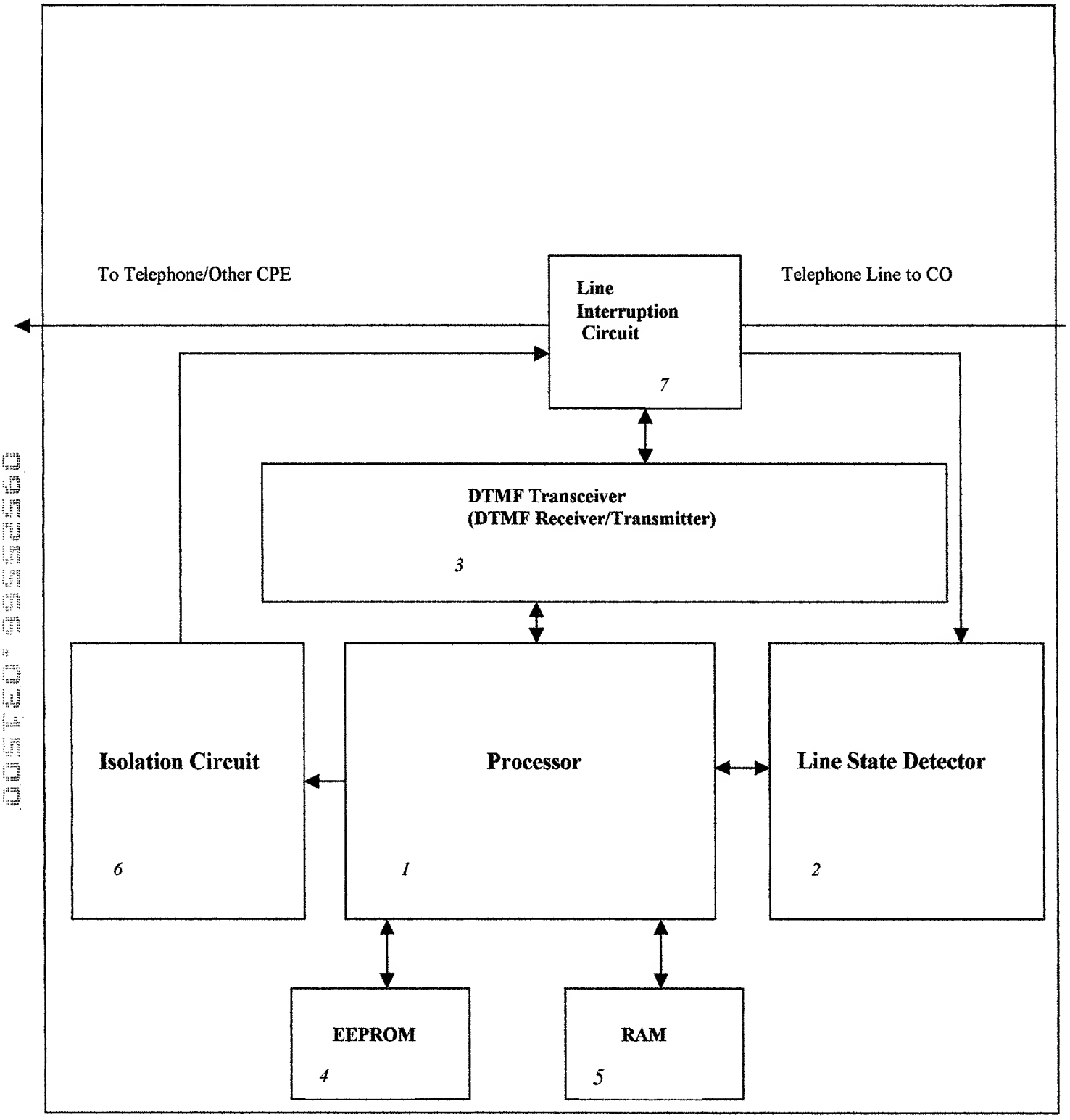


Figure 2b

Intelligent Telephone Prefix Dialer embedded in a POTS Telephone Set

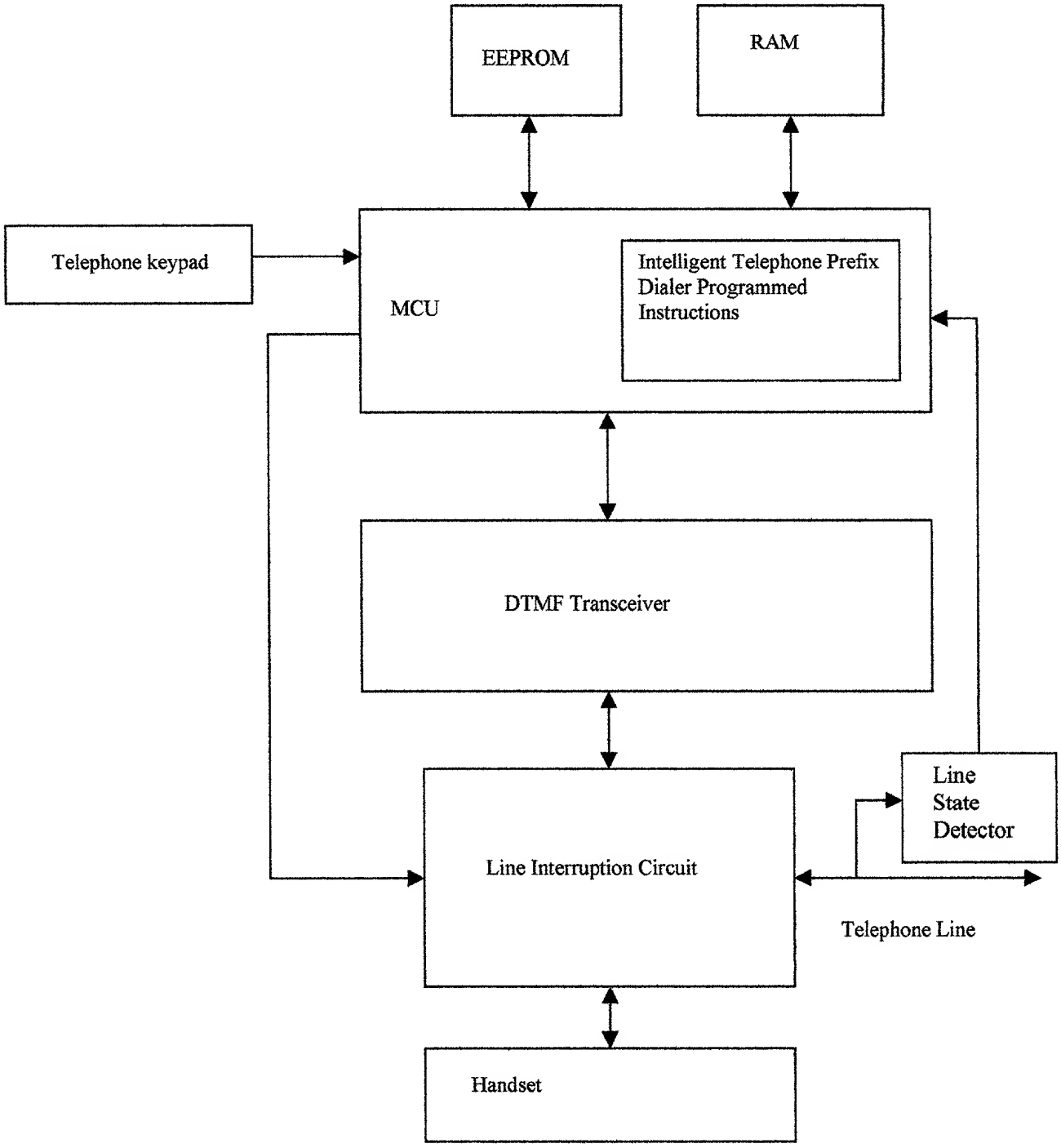


Figure 3

Intelligent Telephone Prefix Dialer embedded in an ISDN telephone set

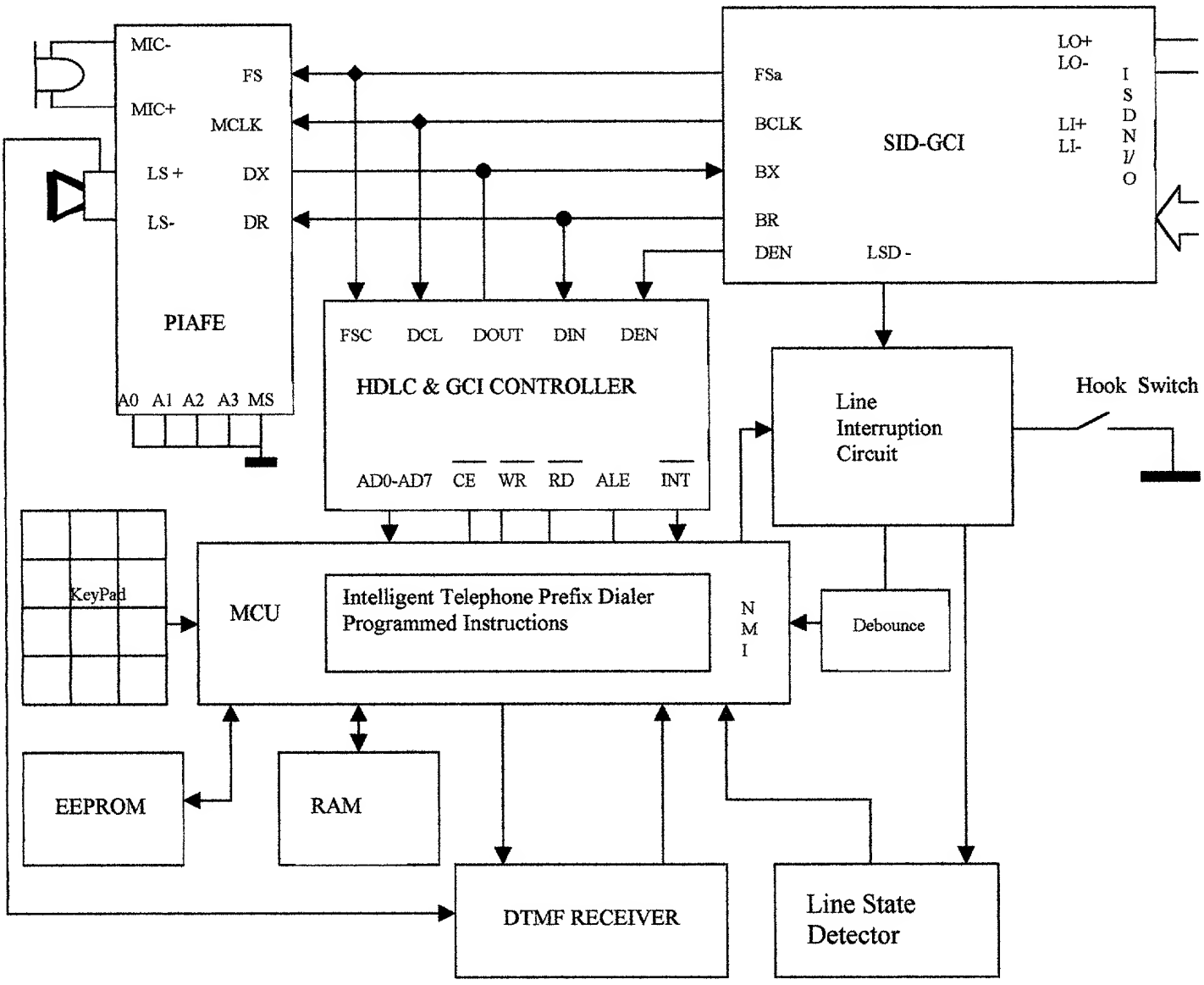
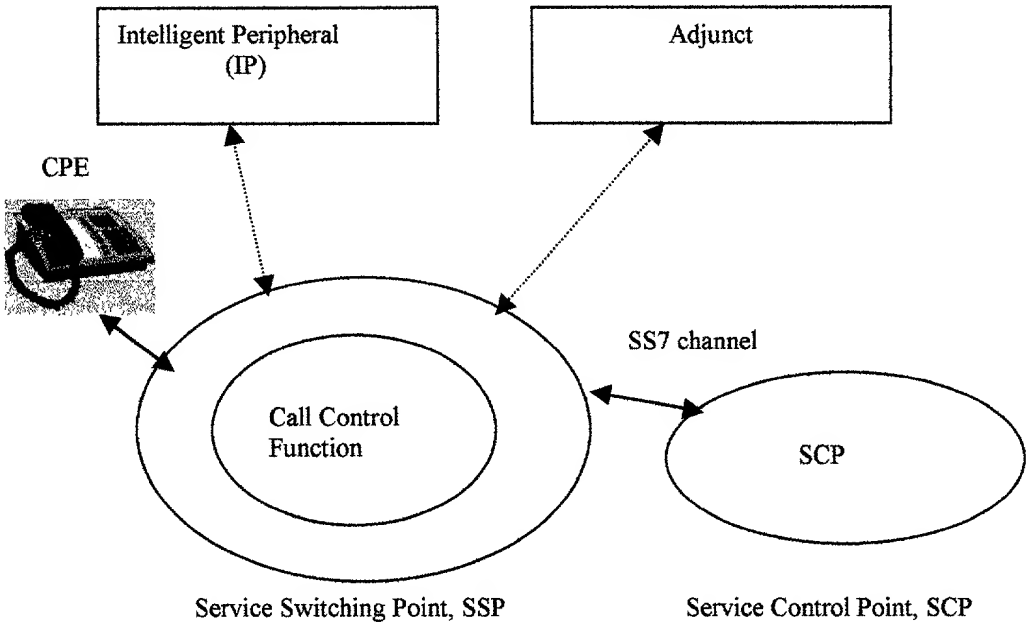


Figure 4

Intelligent Prefix Dialer Integrated into Service Provider's Advanced Intelligent Network Equipment



Control Logic at SCP

- Analyze data triggered from Call Control at SSP
- If redial with prefix is required, append user dialed number to default dial prefix in user options database and send resultant digit sequence back to SSP
- else send "dial as is" message to SSP

Call Control at SSP, IP:

- Capture and count dtmf digits
- Time interdigit delay
- Timeout to close digit sequence
- Report results to SCP
- Receive Dial String from SCP
- Dial Digits to complete call

User Options Interface at SSP/IP

- Capture star code for Intelligent Prefix Dialer options setup and send to SCP
- Receive dial tone stutter prompt from IP, capture default prefix from user, and send codes to SCP
- Receive dial tone stutter/voice acknowledgement from IP

User Options Recording at SCP

- Store default prefix in user options database for the Intelligent Prefix Dialer Service
- Send Acknowledge to SSP

Figure 5

INTELLIGENT TELEPHONE PREFIX DIALER PSEUDOCODE

Version Beta 3.0

Subroutines

DISPLAYPREFIX@
LINEMONITOR@
MONITORLINE@
CAPTUREDIGITS@
CAPOPTIONSTRINGS@
CAPREFIXSTRING@
FLASHLINE@
GETNDX@
CHECK_FOR_TEN@
DIALNUMBER@
PARSEOPTIONS@
PARSESTRING@

Data

LENGTH	/* length of table*/
TABLE	/*start of table*/
SUM	/*sum of digits*/
COUNT	/*count of digits*/
TELNO(8)	/*user dialed digits*/
PREFIX	/*user defined dial prefix*/
DIALTONE_FLAG	/*Flag to indicate line state */ /* On Hook = 0, Off Hook = 1*/ /* Line one to Off Hook Line two*/
DIAL_STRING(10)	/*The reparsed dial string necessary to complete */ /* the call*/
USER_REQUEST_FLAG	/*Flag to initiate user input of prefix code*/
NDX	/*# Pointer for user TELNO entries /*intoDIALSTRING*/
NUMBER_OF_DIGITS_CAPTURED	/*number of digits received by dtmf receiver before*/ /*timeout*/
ON_HOOK_TIME_COUNTER	/*amount of time that receiver is on hook*/
BYPASS	/*bypass bit, if set to 1, bypasses flashook 2 and 3*/

/**/

```
Program MAIN
                                        /*Declare and initialize all variables*/
Declare and Intitilize Hardware specific variables for dtmf transceiver and other hardware
Dtmf                                    var     byte
Bypass                                  var     byte
Dt_flag                                 var     bit
Dt_det                                  var     INL.bit2        /*Detect bit from dtmf receiver*/
Dialtone_flag   var     bit
Number_of_Digits_Captured               var     byte            /*Range index to telno()*/
Digit           var     byte            /*Index  of digits to dial by autodialer*/
I               var     word
L               var     byte
K               var     bit
Ndx             var     nib

Gosub  GETNDX           /*Get ndx from EEPROM*/
For I = 1 to ndx - 1
Get prefix code from EEPROM and place into dial_string(I)
next
GOSUB DISPLAYPREFIX  /*Show the stored dialing prefix*/
CAPDIGITS:
        GOSUB CAPTUREDIGITS  /*Start listening for dial string digits entered by user*/
            If NUMBER_OF_DIGITS_CAPTURED <> (10 – NDX)  + 1 then
              goto INHIBITDIAL
            fi

   GOSUB PARSESTRING        /*Parse the TELNO() into DIAL_STRING()
            Pause 160               /*Time delay before initiating flash hook sequence*/
      GOSUB FLASHLINE       /*First Flash hook*/
            Pause 700               /*Time delay before further action*/
            If BYPASS =1 then GOTO SKIP_FLASHES /*2nd and 3rd flash only necessary for 3
                                                /*way call*/
   GOSUB FLASHLINE          /* 2nd Flash hook*/
            Pause 700               /*Time delay before further action*/
   GOSUB FLASHLINE          /* 3rd  Flash hook*/
            Pause 700               /*Time delay before further action*/
SKIP_FLASHES:
```

```
        pause 700                   /*Time delay before initiate redial*/
    GOSUB DIALNUMBER                /*Dial the number with the required prefix*/
INHIBITDIAL:
        GOSUB LINEMONITOR                   /*Stay put until line goes onhook*/
    GOSUB MONITORLINE               /*Stay put until line goes offhook*/

    GOTO CAPDIGITS          /*Start listening for digits again*/


/*************************************************************************/

SUBROUTINE:LINEMONITOR
LOOPDT1:
        Set DIALTONE_FLAG from (Telephone Line) /*0 is ONHOOK, 1 is OFFHOOK*/
                IF DIALTONE_FLAG indicates OFFHOOK then  GOTO LOOPDT1
        Return

/*************************************************************************/



/*************************************************************************/
SUBROUTINE:MONITORLINE
        Initialize ON_HOOK_TIME_COUNTER to Zero
LOOPDT2:
        Set DIALTONE_FLAG from (Telephone Line) /*0 is ONHOOK, 1 is OFFHOOK*/
                IF DIALTONE_FLAG indicates ONHOOK then
                  Do
                    Increment ON_HOOK_TIME_COUNTER
                    GOTO LOOPDT2
                  Done
                fi
                IF ON_HOOK_TIME_COUNTER > 800 then set BYPASS to 1
                fi
        Return
```

```
/*************************************************************************/

/*************************************************************************/
SUBROUTINE: CAPTUREDIGITS
CAPTUREDIGITS:
        SETUP dtmf hardware for dtmf  READ
        For I = 1 to 1700    /*Initialize Interdigit count down timer*/
         Get DIALTONE_FLAG from (Telephone Line) /*If not still OFFHOOK then EXIT to MAIN*/
          If DIALTONE_FLAG = 0 then GOTO MAIN
                fi
         POLL for dtmf tone from (DTMF RECEIVE CHIP)
          If tone not detected then NEXT I          /*Increment Interdigit count down timer*/
          else
           Increment NUMBER_OF_DIGITS_CAPTURED
           If NUMBER_OF_DIGITS_CAPTURED > (10 – NDX)  + 1 then GOTO MAIN
                                /*user dialed more than */
                                /*prefix digits plus user digits and does not need help here */
           READ dtmf tone into variable DTMF
         TELNO(NUMBER_OF_DIGITS_CAPTURED) = DTMF
        NEXT I
              /*Interdigit Timer has timed out, Check for number of digits received*/
        IF NUMBER_OF_DIGITS_CAPTURED  <  (10 – NDX) + 1  then
          Do
            If  telno(1) = 12 and telno(2) = 1 then
              Do                                /*User has requested to input options*/
                 Gosub PARSEOPTIONS
                 Goto MAIN                      /*Initialize with new user options*/
              Done
            Set NUMBER_OF_DIGITS_CAPTURED =  0
          Done
        Return
/*************************************************************************/
SUBROUTINE: PARSESTRING
          For j = NDX to 10
           DIAL_STRING(j) = TELNO(j – (NDX – 1))
          Next j
```

```
 Return
/*************************************************************************/
/*************************************************************************/
SUBROUTINE: FLASHLINE
            Go ONHOOK
            Pause 600 msec          '600 milliseconds, nominal, can be between 400 and
                                    '700ms
            Go OFFHOOK
      Return
/*************************************************************************/

/*************************************************************************/
SUBROUTINE: DIALNUMBER
      IF PRIVACY_BIT = 1 then
       Do
         DTMFOUT(*67)           /*Dial the Caller ID Block Code */
       Done
      IF PRIVACY_BIT = 0 then
        Do
         DTMFOUT(*82)           /*Dial the Caller ID Send Code*/
        Done
      IF ONE_PLUS_BIT = 1 then
        Do
         DTMFOUT(1)             /*Dial 1 before the area code, etc*/
        Done
      For DIGIT = 1 to 10
      DTMFOUT(DIALSTRING(DIGIT)) /*Dial the prefix code and the rest of the
                                 /*phone number*/
      Return
/*************************************************************************/

/*************************************************************************/

SUBROUTINE: PARSEOPTIONS
      Write to DisplayDevice("PRIVACY?: Y/N) /*Prompt for user to turn Call ID Block ON or */
                                 /*OFF*/
      Gosub CAPOPTIONSTRINGS    /*Get user input*/
```

```
Write user input to EEPROM
Read user input from EEPROM
Write user input from EEPROM to DisplayDevice /*User selection confirmed on */
                                                /*DisplayDevice*/

Write to DisplayDevice("1 PLUS ON?: Y/N) /*Prompt for user to turn 1 PLUS Dialing
                                                /*ON or OFF*/
Gosub CAPOPTIONSTRINGS      /*Get user input*/
Write user input to EEPROM
Read user input from EEPROM
Write user input from EEPROM to DisplayDevice /*User selection confirmed  on*/
                                                /*DisplayDevice*/

Write to DisplayDevice("ENTER PREFIX# ) /*Prompt for user to enter dialing prefix*/
Gosub CAPREFIXSTRING          /*Get user input of dialing prefix*/
Write user input to EEPROM
While user input from EEPROM <> 12
  Do
    Read user input from EEPROM
    Gosub CHECK_FOR_TEN
    Write user input from EEPROM to DisplayDevice /*User entry confirmed  on*/
                                                /*DisplayDevice*/
 Done
    Return
/*************************************************************************/


/*************************************************************************/

SUBROUTINE: DISPLAYPREFIX
    READ PrefixData from EEPROM
    WRITE PrefixData from EEPROM to DisplayDevice
Return
/*************************************************************************/

/*************************************************************************/
SUBROUTINE: CAPOPTIONSTRINGS
```

```
        For I =1 to 1900            /* Time out if no user input*/
          When data present from DTMFreceiver
      Do
                READ data from DTMFreceiver into option_bit
                Return
            Done
        Next
Return
/*************************************************************************/

/*************************************************************************/
SUBROUTINE: CAPREFIXSTRING
        Mu = 0
        For I =1 to 1900            /* Time out if no user input*/
          When data present from DTMFreceiver
         Do
                Mu = mu + 1
                READ data from DTMFreceiver into telno(mu)
                If  telno(mu) = 12  or  mu > 7 then
                  Return
                fi
             done
        Next
        Return
/*************************************************************************/

/*************************************************************************/
SUBROUTINE: GETNDX
for i = 1 to 7
 read from start of  prefix data from EEPROM into digit
 if digit = 12 then ret_ndx
next
return
```

```
ret_ndx:
ndx = I
return
/*************************************************************************/
/*************************************************************************/
SUBROUTINE: CHECK_FOR_TEN
if telno(i) = 10 then zeroit
return
zeroit:
telno(i) = 0                              /*Format output for DisplayDevice*/
return
/*************************************************************************/
```

Programmer Application Notes:

1. Actual programming language used was Parallax, Inc. PBASIC
2. Processor used was the Parallax, Inc. (www.parallaxinc.com), BASIC Stamp II, BS2-IC
3. The Pause instruction argument is in milliseconds
4. The processor clock speed is approximately 20MHZ
5. The PBASIC interpreter executes approximately 3000 instructions per second, i.e. 0.3 milliseconds per instruction. Use the 0.3 milliseconds/instruction value to calculate timeouts and delays that are implemented using loops.
6. Contact the inventor at www.dimensional.com/~jbreki/dialer.html for future development and application notes.

Figure 6

Please type a plus sign (+) inside this box → [+]

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DECLARATION FOR UTILITY OR DESIGN PATENT APPLICATION (37 CFR 1.63)

☑ Declaration Submitted with Initial Filing **OR** ☐ Declaration Submitted after Initial Filing (surcharge (37 CFR 1.16 (e)) required)

Attorney Docket Number	
First Named Inventor	JOHN L. BRECKENRIDGE
COMPLETE IF KNOWN	
Application Number	/
Filing Date	3-15-00
Group Art Unit	
Examiner Name	

As a below named inventor, I hereby declare that:

My residence, post office address, and citizenship are as stated below next to my name.

I believe I am the original, first and sole inventor (if only one name is listed below) or an original, first and joint inventor (if plural names are listed below) of the subject matter which is claimed and for which a patent is sought on the invention entitled:

METHOD AND APPARATUS FOR AN INTELLIGENT TELEPHONE PREFIX DIALER

(Title of the Invention)

the specification of which
☒ is attached hereto
OR
☐ was filed on (MM/DD/YYYY) [ ] as United States Application Number or PCT International Application Number [ ] and was amended on (MM/DD/YYYY) [ ] (if applicable).

I hereby state that I have reviewed and understand the contents of the above identified specification, including the claims, as amended by any amendment specifically referred to above.

I acknowledge the duty to disclose information which is material to patentability as defined in 37 CFR 1.56.

I hereby claim foreign priority benefits under 35 U.S.C. 119(a)-(d) or 365(b) of any foreign application(s) for patent or inventor's certificate, or 365(a) of any PCT international application which designated at least one country other than the United States of America, listed below and have also identified below, by checking the box, any foreign application for patent or inventor's certificate, or of any PCT international application having a filing date before that of the application on which priority is claimed.

Prior Foreign Application Number(s)	Country	Foreign Filing Date (MM/DD/YYYY)	Priority Not Claimed	Certified Copy Attached? YES	NO
			☐	☐	☐
			☐	☐	☐
			☐	☐	☐
			☐	☐	☐

☐ Additional foreign application numbers are listed on a supplemental priority data sheet PTO/SB/02B attached hereto:

I hereby claim the benefit under 35 U.S.C. 119(e) of any United States provisional application(s) listed below.

Application Number(s)	Filing Date (MM/DD/YYYY)

☐ Additional provisional application numbers are listed on a supplemental priority data sheet PTO/SB/02B attached hereto.

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U.S. Parent Application or PCT Parent Number	Parent Filing Date (MM/DD/YYYY)	Parent Patent Number *(if applicable)*

☐ Additional U.S. or PCT international application numbers are listed on a supplemental priority data sheet PTO/SB/02B attached hereto.

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OR
☐ Registered practitioner(s) name/registration number listed below

Name	Registration Number	Name	Registration Number

☐ Additional registered practitioner(s) named on supplemental Registered Practitioner Information sheet PTO/SB/02C attached hereto.

Direct all correspondence to: ☒ Customer Number or Bar Code Label [ ] *OR* ☒ Correspondence address below

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Address	2940 EAST COLFAX AVE. #400				
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Country	USA	**Telephone**	303-884-3740	**Fax**	303 307 0420

I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under 18 U.S.C. 1001 and that such willful false statements may jeopardize the validity of the application or any patent issued thereon.

Name of Sole or First Inventor: ☐ A petition has been filed for this unsigned inventor

Given Name (first and middle [if any])	Family Name or Surname
JOHN L.	BRECKENRIDGE

Inventor's Signature	John L Breckenridge					**Date**	3-15-00
Residence: City	DENVER	**State**	CO	**Country**	USA	**Citizenship**	US
Post Office Address	2940 EAST COLFAX AVE. #400						
Post Office Address							
City	DENVER	**State**	CO	**ZIP**	80206	**Country**	USA

☐ Additional inventors are being named on the ____ supplemental Additional Inventor(s) sheet(s) PTO/SB/02A attached hereto